

Comparison of Post-Operative Periodontal Pocket Depth After Mandibular Third Molar Surgical Extraction by Using Envelop Flap and Modified Triangular Flap

Third Molar Surgical Extraction by Using Envelop and Modified Triangular Flap

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ABSTRACT

Objective: The objective of this study is to compare mean periodontal pocket/probing depth with Envelop flap and modified triangular flap in patients undergoing impacted 3rd molar surgery.

Study Design: A comparative study

Place and Duration of Study: This study was conducted at the Oral and Maxillofacial Department of Multan Dental College/ Ibn-e-Siena Hospital Multan from 13th Sept 2022 to 12 Dec 2022.

Materials and Methods: Non-probability sampling technique with sample size of 150 cases; with 75 cases in each group is calculated at 95% confidence level, 80% power of test and taking magnitudes of mean postoperative periodontal pocketing probing depth i.e. 5.4±0.5mm in Envelop flap and 4.7±0.5mm in Modified triangular flap group in patients underwent impacted third molar extraction.

Results: The mean postoperative periodontal pocket depth in modified triangular flap (group A) was 4.51±0.9mm and 5.68±0.6mm in envelop flap (group B) groups in patients underwent third molar extraction with P= < 0.0001.

Conclusion: There is a higher incidence of periodontal pocket formation when envelop flap retraction is done. Thus, envelop flap should not be retracted while surgical extraction of mandibular third molar.

Key Words: Envelop Flap, Modified Triangular Flap, Periodontal Pocket, Third Molar

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INTRODUCTION

More than 60% of the population in the world has an impacted third molar¹, and about 33% of the population has an impacted single third molar². An "impacted tooth is defined as "a tooth which fails to reach the level of occlusion within the expected time either due to lack of space in the arch or due to malposition of the bud of the third molar in the bone".³⁻⁵

Impacted third molars in the mandible commonly cause complications like pericoronitis (71%), the distal periodontal pocket of a second molar adjacent to the impacted tooth (61%), adjacent second molar root resorption (26%), cysts (47%), and perio-endo-lesion in adjacent teeth⁷. Mandibular third molar teeth may be mesio-angular, disto-angular, vertically or horizontally impacted^{7,8} among which 50% of teeth are mesially inclined, leading to periodontitis, pericoronitis, retrograde pulpitis, distal caries, and root resorption of the second molar.⁹⁻¹²

An impacted third molar usually needs surgical intervention, in which flap procedures, bone guttering, and sectioning of the third molar are common steps.^{13,14} Postsurgical complications, for instance pain, swelling, alveolar osteitis, trismus, and a potential periodontal pocket distal to the second molar, are common in this procedure.^{14,15} Different variables can influence the periodontal healing process, but the most common is flap design.¹⁶⁻¹⁷

Literature discusses different types of flaps, their variations, and the impact of these variations on the periodontal health of the second molar.¹⁷⁻¹⁹ The clinician mostly used an envelope flap and a modified triangular flap design for the removal of an impacted third molar.²⁰ Normal sulcus depth distal to the second

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molar is about 2 mm, but sulcus depth greater than 2mm is considered a pathological pocket.

In one of the clinical studies, the postoperative mean periodontal pocket depth in the envelope flap group was 5.4+0.5 mm and 4.7+0.5 mm in the modified triangular flap group in the patients after third molar surgical extraction.²¹⁻²²

Owing to the general lack of data available in this regard from Pakistan, the rationale of my study is to evaluate the outcome of management of lower third molar impaction by envelop flap versus modified triangular flap in terms of periodontal pocket depth of the adjacent 2nd molar in patients treated at the OMFS department, Multan Medical and Dental College, Multan.

The objective of this study is to compare mean periodontal pocket/probing depth with an envelope flap and a modified triangular flap in patients undergoing impacted 3rd molar surgery.

MATERIALS AND METHODS

This comparative study was conducted at the Oral and Maxillofacial Department of Multan Medical & Dental College Multan/Ibn-e-Siena Hospital Multan from January 13th Sept 2022 to 12 Dec 2022. Non-probability sampling technique with a sample size of 150 cases, with 75 cases in each group, calculated at a 95% confidence level with 80% power of the test, and taking magnitudes of mean postoperative periodontal pocketing probing depth, i.e., 5.4+0.5mm in the envelope flap group and 4.7+0.5mm in the modified triangular flap group in patients who underwent impacted third molar extraction. Both genders with an age range of 17–35 were selected who had a mandibular impacted third molar diagnosed radiographically. Patients with medical conditions that affect wound healing, for instance, diabetes mellitus (BSR > 120 mg/dl), anaemia (Hb 10 mg/dl), patients with a history of steroid therapy, uncooperative patients who are not willing or voluntarily come for follow-up, and patients with a history of bleeding disorders were excluded from the study. All the patients presenting for surgical removal of their impacted lower third molar who fulfil inclusion and exclusion criteria in the outpatient department of oral and maxillofacial surgery at Multan Medical & Dental College Multan/Ibn-e-

Siena Hospital. All demographic details of patients will be enrolled, and all details of patients will be recorded. Patients will also be informed about the risk-benefit ratio to obtain an informed and understood consent. These patients will be divided by lottery into 2 groups, A and B, each comprising 75 patients. The patients in group A will be treated with a surgical technique comprising a modified triangular flap design, whereas in group B the patients will be operated on using an envelope flap design. All patients’ surgical procedures and postoperative periodontal pocketing depth measurements will be done by a consultant maxillofacial surgeon through Williams probe.

The collected data will be entered in SPSS 10.0 and analyzed accordingly. The patient’s data like age, postoperative periodontal pocketing depth are presented by mean & standard deviation. The qualitative variables such as gender are presented as proportions and percentages (%). T- test was used to compare mean postoperative periodontal pocketing depth taking P-value of 0.05 as significant.

RESULTS

A total of 150 patients with impacted lower third molars were included, of whom 70 males, i.e., 46.6%, and 80 (53.3%) were females, showing the female gender to be predominant regarding impacted teeth (Table 1).

There were 44 males (58.6%) and 31 females (41.3%) in group A, while in group B, there were 26 males (34.6%) and 49 females (65.3%) (Table 2).

Table No. 1: Distribution of patients according to age and gender.

Patient’s age	Gender		n (%)
	Male	Female	
17-21	24	32	56 (37.33%)
22-26	24	26	50 (33.33%)
27-31	12	12	24 (16.00%)
32-35	10	10	20 (13.33%)
Total	70	80	150 (100%)

Table No. 2: Frequency Distribution of Age among Females and Males in Modified Triangular and Envelope Flaps

Age (Groups)	Modified triangular Flap			Envelope Flap		
	Females	Males	n (%)	Females	Males	n (%)
17-21	14	17	31 (41.3)	18	07	25 (33.3)
22-26	10	14	24 (32.0)	16	10	26 (34.7)
27-31	5	6	11 (14.7)	7	06	13 (17.3)
32-35	2	7	9 (12.0)	8	03	11 (14.7)
Total	31	44	75 (100%)	49	26	75 (100%)

Table No. 3: Descriptive results of Postoperative periodontal pocket depth in modified triangular and envelop flap among patients on the basis of Gender

Group(s)	Gender		Total	p-value
	Male	Female		
Patients	24.79 ± 5.37	24.35 ± 5.17	24.55 ± 5.25	
Flap Type				
Modified triangular flap	4.44 ± 0.884	4.62 ± 0.946	4.51 ± 0.908	0.0001
Envelop flap	5.68 ± 0.656	5.68 ± 0.639	5.68 ± 0.640	
Total	70	80	150	

The mean age was 24.55 years (SD5.25), ranging from 17 to 35 years. The mean age of males was 24.78 years (SD5.36 years), while the mean age of females was 24.35 years (SD5.17 years).. The mean postoperative periodontal pocket depth in modified triangular flap (group A) was 4.510.9mm and 5.680.6mm in envelop flap (group B) groups in patients who underwent third molar extraction with $P = 0.0001$, $t = -9.063$. The mean postoperative periodontal pocket depth in group A was higher in female (4.620.9mm) than male (4.440.8mm), while it was equally high in male (5.680.6mm) and female (5.680.6mm) in group B patients. (Table 3).

DISCUSSION

According to our study, the mean postoperative periodontal probing depth on the distal surface of an adjacent second molar at 7 days after surgery indicates significant differences between the modified triangular flap (group A) and envelop flap (group B) groups. The mean postoperative periodontal pocket depth in modified triangular flap (group A) was 4.510.9mm and 5.680.6mm in envelop flap (group B) groups in patients who underwent third molar extraction with $P = 0.0001$, $t = -9.063$. (Table 3)

In a prospective study, Briguglio et al. did third molar extraction with two different types of flaps, i.e., the envelope flap and the modified triangular flap, and postoperatively they found that the periodontal pocket was significantly smaller in the modified triangular flap than that of the envelop flap^{23,24}. In contrast, Adarsh Desai found that the modified triangular flap caused more periodontal destruction and clinical attachment loss than the envelope flap.²⁵ The sample size of Adarsh et al's study was very small in comparison to this study, which explains the contradictory results. Envelop flap resulted in more periodontal destruction for the following reasons.¹ destruction of periodontal ligament tissues when inducing sulcular incision,² increased osteoclastic activity when elevating mucoperiosteal flap resulting in bone loss, and³ a higher risk of wound

dehiscence postoperatively compared to triangular flap.²⁶

Farheen Ustad et al also concluded that pocket depth with an envelope flap is significantly greater than that of a triangular flap.²⁸ Our study also concluded that periodontal healing was more favourable with a modified triangular flap as compared to an envelope flap.

In 2020, deSiva et al. found that periodontal pocket depth was significantly less with a triangular flap than that of an envelope flap²⁹. Similar results were found in our study, in which periodontal healing with a triangular flap was significantly better than that with an envelope flap.

Stephens et al. concluded that flap design did not have any impact on the second molar regarding the healing of periodontium³⁰, but we found that periodontal depth was significantly higher in the envelope flap than in the modified triangular flap. This increased pocket depth may be due to increased tissue tension and wound dehiscence.

In 2021, Ahmed et al. concluded that the triangular flap resulted in better periodontal health than the envelope flap. They also mentioned that post-operative bone loss was significantly less with a triangular flap than with an envelope flap.³¹ Our study followed the same pattern as Ahmed's study, which found that mean periodontal pocket depth is significantly less with a triangular flap than an envelope flap.

CONCLUSION

There is a higher incidence of periodontal pocket formation when envelope flap retraction is done. Thus, showing a significant association between the modified triangular flap (group A) and envelop flap (group B) groups used for removal of third molar. ($P = < 0.0001$, $t = -9.063$). Thus, envelop flap should not be retracted while surgical extraction of mandibular third molar.

Author's Contribution:

Concept & Design of Study: Muhammad Shoaib
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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